International Business Research; Vol. 13, No. 3; 2020
ISSN 1913-9004 E-ISSN 1913-9012
Published by Canadian Center of Science and Education

The Price Elasticity of Demand of Australian Urban Residential Consumers and Water Restrictions

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Received: January 20, 2020 Accepted: February 13, 2020 Online Published: February 26, 2020

doi:10.5539/ibr.v13n3p153 URL: https://doi.org/10.5539/ibr.v13n3p153

Abstract

The aim of this article is to provide derived estimates of the price elasticity of demand for water for residential urban consumers in Australia over the years 2005/06 to 2016/17. The results of the study indicate that higher water and sewerage prices, bundled together, are associated with lower demand for water. The relationship, therefore, between the prices of water and sewerage and demand for water is a negative one. This relationship, however, is a relatively inelastic one, that is a large change in price is required before there is much of a change in demand for water. With the supply of water in most Australian urban centers are controlled by monopoly suppliers this means that there is some scope for water restrictions to negate this market power.

Keywords: water; sewerage; price elasticity; residential; restrictions

1. Introduction

Water is a vital element of life and plays an essential role in economic development. Water is also a scarce resource and it is essential that water prices are a reflection of the cost of extracting and delivering it to consumers, in order that water supply and sewerage disposal infrastructure assets are used efficiently, and so that funds can be raised to finance improvements and extensions to the infrastructure. Water prices, therefore, must be high enough to provide businesses (and their owners) with a reasonable return on the funds invested in the assets. At the same time water is a necessity for all, and its use has environmental impacts, pricing therefore, is problematic given the political and social impacts.

In recent years the difficulties with ensuring a sustainable supply of water for Australian urban centers has been an important issue of economic and political concern. In response to this concern a range of measures have been undertaken by governments at the national, state and territory levels, designed to cope with these problems. In doing so, the social, environmental and political opposition to the building of large water storage dams and reservoirs has meant that a range of non-traditional water sources have been developed (desalination and recycling plant), as well as investment in water transmission pipes between regions. In addition, measures have been undertaken such as the creation of more commercial organizational structures to undertaken the deliver, and disposal, of water in order to improve operational efficiency. Finally more use has been made of pricing mechanisms to influence water demand.

In influencing the demand for water traditionally the measures that have been used most have been voluntary and mandatory water restrictions. Australian urban residents have been the subject of periodic water restrictions since the 1920s (Cathcart, 2010). Over time the increasing availability and affordability of domestic appliances, such as dishwashers, evaporated water cooling systems, and automatic washing machines has contributed to an increase in average water use. In the post-Second World War period rising levels of income, home ownership, and motor car ownership rates also contributed to a rise in demand for water (Morgan, 2011; Davison, 2008; Davison 2008). Water use restrictions were used, in this period, in a large degree, as an alternative to the substantial raising of prices, the latter being opposed for mainly political reasons. Water prices were also not used as historically water charges were based not on the use of water, but instead on property rating values. The replacement of this approach with ones based more on volumes consumed was a slow one, with the introduction of water meters so it could occur taking place at a varied pace across the country (Butlin, Barnard & Pincus, 1982; Byrnes, 2013; Industry Commission, 1992). Since the 1980s, however, water pricing based on volume use has become common in Australian urban centers.

Given the increased use of charging based on water use, the use of water restrictions and the restraints that exist on the supply of water in Australia it is important to understand the relationship between the demand by urban consumers and the prices they pay. When it comes to the pricing of the extraction and delivering of water there are two main components. First charges for water might be designed to only cover the current operational and maintenance costs of the infrastructure. This is considered a form of partial cost recovery. The second approach is to aim for charges that provide for a full cost recovery, which covers operational and maintenance costs, as well as yields a depreciation allowance and some net return on the historical capital costs.

The purpose of this article, therefore, is to derive estimates of the price elasticity of demand for water for Australian residential urban consumers over the years 2005/06 to 2016/17. The paper is structured as follows. The first section provides a general background account of water pricing for residential urban water customers. This is followed by sections on the methodology and data used, as well as one that analyses the results of the study. In the final section some conclusions are made.

2. Background

Urban water is priced differently from most other goods given that it is largely provided by monopoly providers who can structure prices, largely immune from market forces. In addition, restrictions are used by government to control consumption in times of shortages. The use of restrictions implies that governments believe that water demand is market price inelastic, and responses to changes in prices take place very slowly. Water suppliers also have a restricted ability to respond quickly to increase water supplies when prices rise. The latter is largely true when water supplies are largely dependent on capital intensive, climate influenced surface water stores, but is less so with desalinated water supplies.

In the Australian case water usage prices have increased substantially over the years since the 1990s. From Figures 1 and 2 it is possible to see that in all the major cities in Australia water bills have risen since the early 2000s, both in normal and in constant $ terms. This has taken place for a range of reasons, including the increased desire on the part of governments to extract greater returns from water industry assets, as well as the need to pay for substantial investments on non-traditional water sources. It is expected that projected population growth, rising real incomes and a reluctance to build surface water reserves will put further pressure on supplies of water and lead to prices of water remaining high (Freebairn, 2008).

In recent years public authorities in Australia have focused on technological solutions to water shortages, such as the investment in recycling and/or desalination plant. This has meant that there has been a considerable level of capital expenditure undertaken by the water utilities in Australia. Figure 3 provides data on the level of this expenditure in constant $ terms. From this Figure it can be seen that this expenditure was greatest in the years 2006 to 2012, in a period of drought in Australia, and a time of substantially increasing prices (Figures 1 and 2) to cover the financing and to provide a return on this investment.

The increase in prices overall of water in Australia has led to a fall in consumption by Australia's residential consumers. Figure 4 provides data on the average annual water supply to residents in the major capital cities in Australia. As can be seen this has fallen from the high levels of consumption in the mid-2000s. This period, however, was also one in which water restrictions were used in various places, with various intensity, and so a part of this decline in demand for water would have occurred because of impact of these measures.

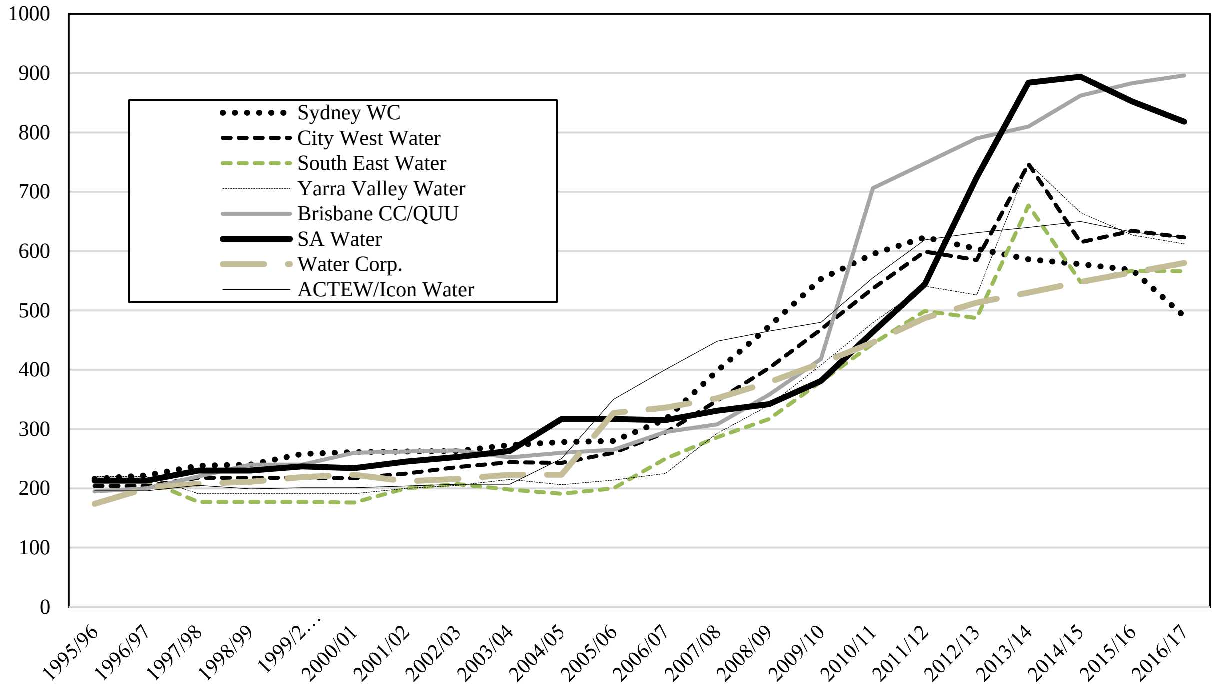

Figure 1. Annual Water Bill Based on 200 kL/Water, 1995/1996 to 2016/17

Source: Water Services Association of Australia (1996-2005), National Water Commission (2006-14). Australia, Bureau of Metrology (2015-18).

City West Water, Yarra Valley Water and South East Water are located in Melbourne. SA Water supplies water to Adelaide and the rest of the state of South Australia. The Water Corp. supplies water to Perth are other areas of south-west Western Australia.

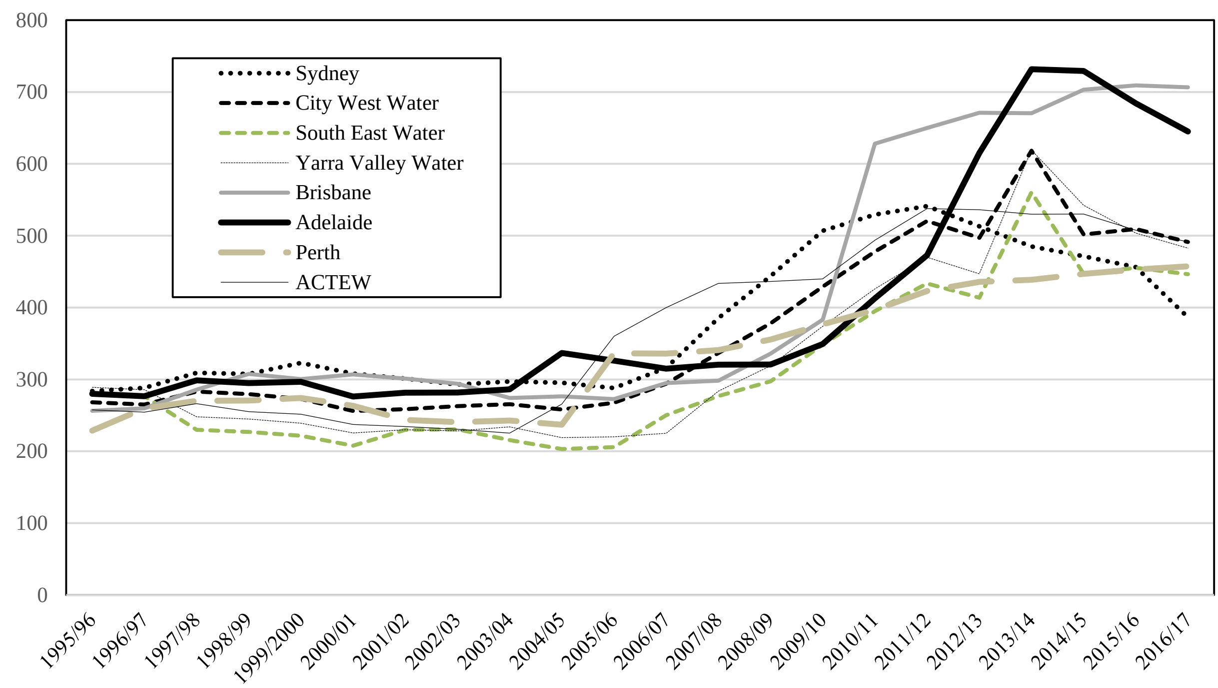

Figure 2. Annual Water Bill Based on 200 kL/Water, 1995/1996 to 2016/17 (constant $2006/07)

Source: Water Services Association of Australia (1996-2005), National Water Commission (2005-14). Australia, Bureau of Metrology (2015-18). Australian Bureau of Statistic (1998-2018).

City West Water, Yarra Valley Water and South East Water are located in Melbourne. SA Water supplies water to Adelaide and the rest of the state of South Australia. The Water Corp. supplies water to Perth are other areas of south-west Western Australia.

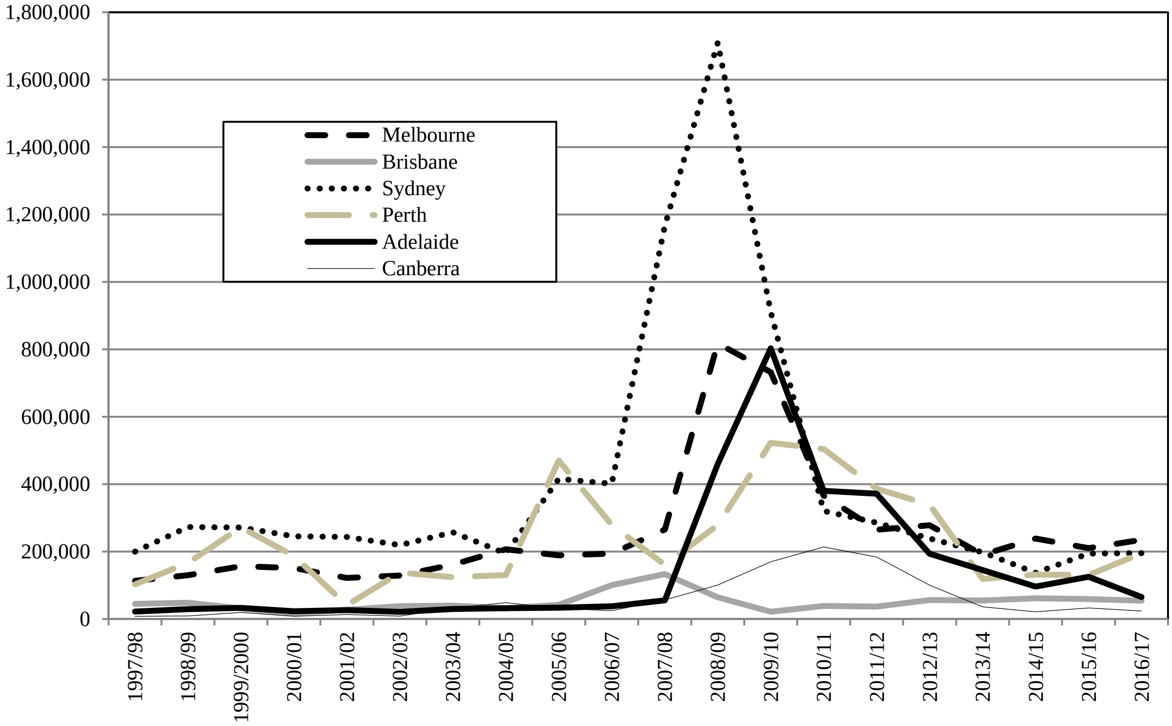

Figure 3. Capital Expenditure on Water and Wastewater Infrastructure, 1997/1998 to 2016/2017 ($000' 2006/2007)

Source: Water Services Association of Australia (1998-2005), National Water Commission (2006-14). Australia, Bureau of Metrology (2015-18).

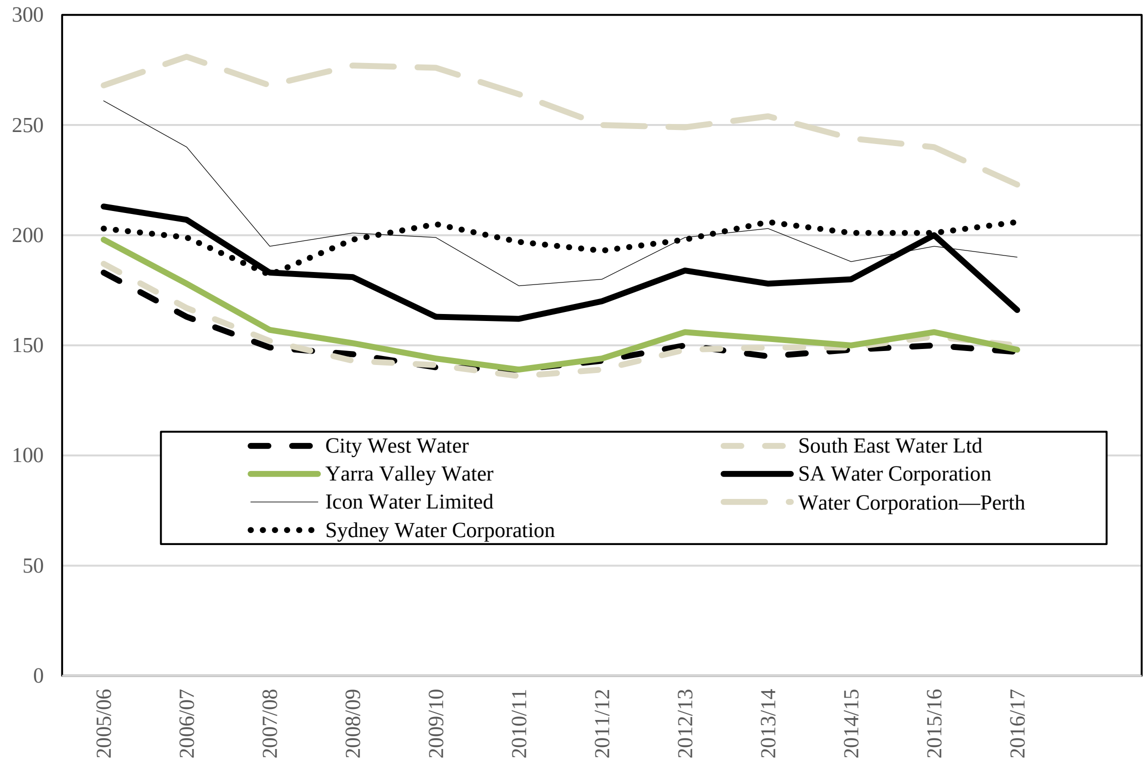

Figure 4. Average Annual Residential Water Supplied, 2005/06 to 2016/17 (kL/property)

Source: National Water Commission (2006-14). Australia, Bureau of Metrology (2015-18).

City West Water, Yarra Valley Water and South East Water are located in Melbourne. SA Water supplies water to Adelaide and the rest of the state of South Australia. The Water Corp. supplies water to Perth are other areas of south-west Western Australia.

Over the period since the 1990s prices have not risen at uniform rates. Instead initially in some cities high prices were charged to commercial users in order to make up for losses, incurred on supplying residential customers (Productivity Commission, 2008). Community services obligations were also often incorporated into water pricing. Over time a number of these cross subsidies have been gradually phased out, changing the relative prices charged to different types of consumers. In terms of these different types of consumers, the structures of water charges still do rely on the type of property (residential, commercial of industrial). For residential properties that have water meters, most water suppliers levy an access charge based on the value of the property, which often allows the customer to an allowance of water on which no extra charge is levied.

There is a substantial difference between Australian water suppliers and jurisdictions in their structuring of urban water and sewerage prices. Table 1 provides data for the various urban utilities in Australia's capital cities in 2015/16. It can be seen from the data that both the average cost water and sewerage vary across the country. In addition, in some cases water rates are higher than sewerage rates (i.e. Queensland Urban Utilities, City West Water, and SA Water), while in others the reverse is true (i.e. Sydney Water, TasWater). In most Australian jurisdictions water prices are structured on the basis of a fixed access charge as well as a volumetric based charge (see Table 2). The use of the inclining block also differ (Crase, O'Keefe & Dollery, 2008). For sewerage most suppliers levy a single, fixed charge.

In Australia most urban water suppliers are state government owned, corporatized entities. Despite this state jurisdictional orientation they are the subject of a national approach to pricing. This has been so since 1994 when the Water Reform Framework was endorsed by each of the state, territory and national governments. The Framework included an agreement to introduce pricing practices that aimed to recover costs based on water consumption levels and was free of cross subsidies between different types of consumers. The Framework also included an agreement to establish two-part tariffs in urban centers where possible. Urban water reform was extended with the 2004 National Water Initiative, which stated that water pricing practices be improved to better reflect costs (Council of Australian Governments, 1994, 2004). Water prices for urban water and sewerage in Australia today, therefore, cover operating, maintenance and administration costs, as well as any borrowing costs and to depreciation on assets/the cost of refurbishments. As well from 2004 onwards each jurisdiction became committed to having water pricing regulated by each of the state and territories' economic regulator.

Table 1. Average Water and Sewerage Costs, Australian Urban Utilities 2015/16 ($/KL p.a.)

2015/16	Water $/KL p.a.	Sewerage $KL p.a	W/S %
Sydney Water Corporation	490.00	653.00	75.0
City West Water	623.00	523.74	119.0
South East Water	566.00	653.00	86.7
Yarra Valley Water	612.41	647.74	94.5
Queensland Urban Utilities	896.00	522.00	171.6
SA Water	818.00	435.00	188.0
Water Corporation – Perth	579.82	758.00	76.5
TasWater	528.56	596.00	88.68
Icon Water	622.00	529.00	117.6

Source: Australia, Bureau of Metrology (2015-18).

Table 2: Water and sewerage rate structures, Australian urban utilities 2015/16 ($/KL p.a.)

		Fixed charge ($/property)	1st step ($/KL)	2nd step ($/KL)	3rd step ($/KL)
Sydney Water	Water	231.39			
	Sewerage	257.32			
City West Water	Water	231.89	2.43	2.87	4.26
	Sewerage	257.32	1.83		
South East Water	Water	231.89			
	Sewerage	257.32			
Yarra Valley Water	Water	177.63	2.66	3.12	4.62
	Sewerage	357.50	2.14		
Icon Water	Water	102.87	2.64	5.31	
	Sewerage	531.23			
Queensland Urban Utilities	Water	198.48	3.52	4.20	
	Sewerage	521.88			
SA Water	Water	286.20	2.27	3.24	3.51
	Sewerage	307.00			
Water Corporation-Perth	Water	229.91	1.55	1.05	2.91
	Sewerage	371.03			
TasWater	Water	329.48	1.00		
	Sewerage	496.48			

Source: Australia, Bureau of Metrology (2015-18).

Despite the introduction of cost-based pricing practices in Australia water use regulations and restrictions are still widely used. These restrictions are still often the response on the part of governments and water companies to urban water shortages. Despite this practice there is at present in Australia some interest in making use of more flexible water pricing in order to ring about a balance in demand for water with its supply. Whether using water usage prices will be effective, however, relies on water's price elasticity of demand (change in water demanded in response to a given price change). In addition, how long it takes consumers to respond to changes in water prices is also important.

The most frequent response of economists to water shortages is to advocate the use of water prices more strategically (United States, Environment Protection Agency, 2003; Dwyer, 2006; Sibly, 2006; Cooper, Rose & Crase, 2011; Cooper & Crase 2016; Barrett, 2004). Much has been written about the benefits of establishing water prices that reflect costs of the resource in alternative uses (Pawse & Crase, 2013). If efficient water prices are to be established it's important that a good knowledge of demand elasticities is achieved. Past Australian studies have provided estimates of this price elasticity to range between -0.3 to -0.5 (Productivity Commission, 2011; Sydney Water, 2011). Overseas studies come to similar results (United States, Environment

Protection Agency, 2003). Using data collected by the Australian Government it is possible to derive demand elasticities for water in Australia's urban centers.

3. Method and Data

The method used is to run regressions estimating the price elasticity of demand with water consumption levels as the dependent variable and the price of water as the independent variable. The data set used is mainly based on the statistical reports published by the Water Services Association of Australia, the National Water Commission and the Australian Bureau of Metrology. This has been added to be additional statistical data taken from the annual reports of the water utilities. The water companies included in the study are listed in the table provided in the Appendix, along with the years for which the data was available. Descriptive statistics of the data is provided in Table 3.

As consumers are typically charged for water and sewerage services bundled together regressions are also run with the bundled price of water and sewerage and consumption of water. In addition other independents variables are used, such as the average rainfall and average temperature (data from the Bureau of Metrology) and the number of consumers (data from the National Water Commission).

Table 3. Descriptive Statistics

	Mean	Std. Deviation	N
Dw (water consumption KL)	221.3796	100.24595	665
Pw (price of water $/KL)	528.6332	226.72380	665
Ps (price of wastewater $/KL)	561.2424	293.79994	665
T (average max. temperature C)	24.1995	13.03532	665
R (average rainfall)	870.7161	471.37608	665
C (average number of consumers)	364393.8481	846255.48651	665

4. Results

Multiple Regression: Dw=f(Pw, T, R, C)

The initial regression has the consumption of water regressed to a number of independent variables. These include:

- Dw: average annual residential water supplied (kL/property);
- Pw: price of water in the locality annual bill based on 200kL/a - water ($);
- T: average maximum temperature in the locality;
- R: average rainfall in the locality;
- C: number of consumers (population receiving water supply services - 000s)

Model 1.1

To begin with demand is regressed with the price of water alone:

$Dw = \beta_0 + \beta_1 Pw + \varepsilon$ (1)

The results are provided in Table 4. The R-square of 0.000 indicates that the water demand cannot be explained by solely water price, thus, the control variables such as temperature, rainfall, consumers are added in the model.

Table 4. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.008[a]	0.000	-0.001	112.94019

a. Predictors: (Constant), Pw

b. Dependent Variable: Dw

*Model 1.2. Controlling variables added.*_

The multiple regression model using the other independent variables is as follows:

$Dw = \beta_0 + \beta_1 Pw + \beta_2 Temp + \beta_3 Rainfall + \beta_4 Consumers + \varepsilon$

R-square = 0.196 indicates that there is 19.6 per cent of the dependent variable that is explained by independent variables. The results are provided in Table 5.

In ANOVA and Coefficients Tables 6 and 7, the value of P-values of F-test and t-test are 0.000 which is less than 0.05. They indicate that there is a strong, significant relationship between the independent and dependent variables.

Dw = 283.804 - .124Pw + 1.618 Temp – 0.029 Rainfall – 3.139 Consumers + Ɛ

The results indicate that:

- a higher water price, is associated with lower demand;
- a higher temperature, is associated with higher demand;
- a higher rainfall, is associated with lower demand;
- a higher population, is associated with lower demand per person on average

Table 5. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.443[a]	0.196	0.191	90.07668

a. Predictors: (Constant), Con, temp, rainfall, Pw

b. Dependent Variable: Dw

Table 6. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1308647.327	4	327161.832	40.322	0.000[b]
	Residual	5371340.976	662	8113.808		
	Total	6679988.303	666			

a. Dependent Variable: Dw

b. Predictors: (Constant), Con, temp, rainfall, Pw

Table 7. Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	283.804	12.115		23.425	0.000
	Pw	-0.124	0.016	-0.283	-7.848	0.000
	temperature	1.618	0.269	0.210	6.021	0.000
	rainfall	-0.029	0.008	-0.135	-3.779	0.000
	consumers	-3.139E-5	0.000	-0.265	-7.496	0.000

a. Dependent Variable: Dw

Multiple Regression: Dw=f(Pw, Ps, temp, rainfall, consumers)

In Australian jurisdictions although water and sewerage are generally rated separately consumers pay with their rates bundled together in a single bill. For that reason it is possible that demand for water is better related to changes in both water and sewerage charges. For that reason Model 2 includes both prices.

Model 2.1.

To begin with demand is regressed with the price of water and sewerage:

$Dw = \beta_0 + \beta_1 Pw + \beta_2 Ps + \varepsilon$ (1)

The results are provided in Table 8. The R-square of 0.043 indicates that there is only 4.3 percent the dependent variable can be explained by the independent variables, however, the value of significance of F-test is 0.000

which indicate the model is significant (as seen in ANOVA table). The value of t-test of independent variables are significant that are very close to zero (as seen in coefficient Table 10).

$Dw = 230.209 + 0.067Pw - 0.094Ps + \varepsilon$

This result shows that there is positive significant impact of water price on water demand, and negative significant impact of the sewage price on demand.

Table 8. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.208[a]	0.043	0.041	110.67250

a. Predictors: (Constant), Ps, Pw

b. Dependent Variable: Dw

Table 9. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	407700.589	2	203850.295	16.643	0.000[b]
	Residual	9051569.782	739	12248.403		
	Total	9459270.371	741			

a. Dependent Variable: Dw

b. Predictors: (Constant), Ps, Pw

Table 10. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	230.209	9.339		24.651	0.000
	Pw	0.067	0.019	0.154	3.481	0.001
	Ps	-0.094	0.016	-0.254	-5.767	0.000

a. Dependent Variable: Dw

*Model 2.2. Controlling variables added.*_

The multiple regression model using the other independent variables is as follows:

$Dw = \beta_0 + \beta_1 Pw + \beta_2 Ps + \beta_3 Temp + \beta_4 Rainfall + \beta_5 Consumers + \varepsilon$

The results are provided in Table 11. The R-square = 0.207 indicates that there is 20.7 per cent of the dependent variable that is explained by independent variables. This R-square value is acceptable since the unpredictable variables involved in the model such as temperature, rainfall, and population. In ANOVA Table 12, the value of P-value of F-test is 0.000 which is less than 0.05. It indicates that it is strong significant relationship between independent and dependent variables. In the coefficients Table 13, the significant value (sig.) of all independent and controlled variables are very close to zero, which means they have significant impact on water demand.

$Dw = 288.145 - 0.1Pw - 0.04\ Ps + 1.629\ Temp – 0.022\ Rainfall – 3.232\ Consumers + \varepsilon$

The results indicate that:

- a higher water price, is associated with lower demand;
- a higher sewage price, is associated with lower demand;
- a higher temperature, is associated with higher demand
- higher rainfall, is associated with lower demand,
- a higher population, is associated with lower demand per person on average.

Table 11. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.455[a]	0.207	0.201	89.61687

a. Predictors: (Constant), Con, temp, rainfall, Pw, Ps

Table 12. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1380151.734	5	276030.347	34.370	0.000[b]
	Residual	5292550.098	659	8031.184		
	Total	6672701.832	664			

a. Dependent Variable: Dw

b. Predictors: (Constant), Con, temp, rainfall, Pw, Ps

Table 13. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	288.145	12.153		23.710	0.000
	Pw	-.100	0.019	-0.226	-5.192	0.000
	Ps	-0.040	0.015	-0.117	-2.592	0.010
	temperature	1.629	0.267	0.212	6.094	0.000
	rainfall	-0.022	0.008	-0.104	-2.818	0.005
	consumers	-3.232E-5	0.000	-0.273	-7.737	0.000

a. Dependent Variable: Dw

5. Conclusion

The results of the study indicate that higher water prices are associated with lower demand for water. In addition, a higher sewerage price, is also associated with lower demand for water. The bundled prices of water and sewerage explains a greater change in demand for water than just using the water price. This relationship between the prices of water and sewerage on the one hand and demand for water on the other is a negative one. This relationship, however, is a relatively inelastic one that is a large change on price is required before there is much of a change in demand for water.

What this means is that there are a range of other factors that explain changes in demand for water besides just price. Those that were included in the model involve higher temperatures being associated with higher demand for water, higher rainfall being associated with lower demand for water and higher population meaning lower demand per person on average.

As water is a fairly strong necessity of life, demand for it is fairly steady and influenced by a wide range of factors. As water's price elasticity of demand (and sewerage's) is relatively inelastic, and as the supply of residential urban water is delivered by monopoly suppliers, there seems a firm justification by governments for making use of water restrictions. As market power is exerted by the water suppliers, and demand is price inelastic any use of substantial price increases to moderate demand for water, will more likely result in monopoly rents being extracted from consumers rather than any substantial moderation in demand for water. Economists who advocate further use of prices to moderate demand for water are probably under estimating the elasticities both of demand and supply of water. Further research on the nature of the price elasticities of both demand and supply for water would enable greater insights into the effectiveness of restrictions and water usage charges. Also research on other possible variables that impact on water demand would be useful.

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Appendix

Table 14. Australian urban centers used in the study with the years

Albury City Council	2005/06-2016/17
Aqwest—Bunbury Water Corporation (W)	2006/07-2016/17
Ballina Shire Council	2005/06-2016/17
Barwon Water	2005/06-2016/17
Bathurst Regional Council	2005/06-2016/17
Bega Valley Shire Council	2006/07-2016/17
Bundaberg Regional Council	2014/15-2016/17
Busselton Water (W)	2005/06-2016/17
Byron Shire Council	2005/06-2016/17
Cairns Water and Waste (Cairns Regional Council)	2009/10-2016/17
Cassowary Coast Regional Council	2014/15-2016/17
Central Coast Council	2015/16-2017/17
Central Gippsland Water	2005/06-2016/17
Central Highlands Regional Council	2014/15-2016/17
Central Highlands Water	2005/06-2016/17
City West Water	2005/06-2016/17
Clarence Valley Council	2005/06-2016/17
Coffs Harbour City Council	2005/06-2016/17
Coliban Water	2005/06-2016/17
Dubbo Regional Council	2015/16-2016/17
East Gippsland Water	2005/06-2016/17
Essential Energy	2005/06-2015/16
Eurobodalla Shire Council	2006/07-2016/17
Wide Bay Water (Fraser Coast Regional Council)	2010/11-2016/17
Gladstone Area Water Board	2015/16-2016/17
Gladstone Regional Council	2014/15-2016/17
Gold Coast City Council	2005/06-2016/17
Goulburn Mulwaree Council	2009/10-2016/17
Goulburn Valley Water	2005/06-2016/17
GWMWater	2005/06-2016/17
Gympie Regional Council	2013/14-2016/17
Hunter Water Corporation	2005/06-2016/17
Icon Water Limited	2005/06-2016/17
Kempsey Shire Council	2005/06-2016/17
Lismore City Council	2005/06-2016/17
Livingstone Shire Council	2014/15-2016/17
Logan City Council	2005/06-2016/17
Lower Murray Water	2005/06-2016/17
Mackay Regional Council	2007/08-2016/17
MidCoast Council	2005/06-2016/17
North East Water	2005/06-2016/17
Orange City Council	2006/07-2009/10. 2012/13-2016/17
Port Macquarie Hastings Council	2005/06-2016/17
Power and Water—Alice Springs	2005/06-2016/17
Power and Water—Darwin	2005/06-2016/17
Queanbeyan–Palerang Regional Council	2015/16-2016/17
Queensland Urban Utilities	2010/11-2016/17
Redland City Council	2014/15-2016/17
Riverina Water (W)	2005/06-2016/17
Fitzroy River Water (Rockhampton Regional Council)	2008/09-2016/17
Rous Water	2009/10-2011/12
Shoalhaven City Council	2005/06-2016/17
SA Water Corporation	2013/14-2016/17
South East Water Ltd	2005/06-2016/17
South Gippsland Water	2005/06-2016/17
Southern Downs Regional Council	2014/15-016/17
Sydney Water Corporation	2005/06-2016/17
Tamworth Regional Council	2005/06-2016/17
Tasmanian Water and Sewerage Corporation	2014/15-2016/17
Toowoomba Regional Council	2011/12-2016/17
Townsville Water (Townsville Regional Council)	2009/10-2016/17

Tweed Shire Council	2005/06-2016/17
Unitywater	2010/11-2016/17
Wannon Water	2005/06-2016/17
Water Corporation—Albany	2005/06-2016/17
Water Corporation—Australind/Eaton	2011/12-2016/17
Water Corporation—Geraldton	2005/06-2016/17
Water Corporation—Kalgoorlie–Boulder (W)	2005/06-2016/17
Water Corporation—Mandurah	2005/06-2016/17
Water Corporation—Perth	2005/06-2016/17
Western Downs Regional Council	2014/15-2016/17
Western Water	2005/06-2016/17
Westernport Water	2005/06-2016/17
Whitsunday Regional Council	2014/15-2016/17
Wingecarribee Shire Council	2005/06-2016/17
Yarra Valley Water	2005/06-2016/17

Source: National Water Commission (2006-14). Australia, Bureau of Metrology (2015-18).